

Claims

1. An adhesive monitoring system for monitoring the application of adhesive to an item, wherein the system includes means for determining the position of the item on a production line, camera means for taking an image of a monitored item, means for triggering the camera means to take an image of the item at one or more set item positions, and processing means for analysing the images produced and for determining the correct application of adhesive from this analysis.
2. The system of claim 1, wherein the processing means compares item images taken by the camera means with reference images.
3. The system of claim 1 or 2, wherein the processing means analyses the item images to recognise features within the item image.
4. The system of any preceding claim, wherein the processing means analyses the item images along one or more measurement lines.
5. The system of claim 4, wherein at least one of the measurement lines is in the direction in which the adhesive is applied to the item.
6. The system of claim 4 or 5, wherein at least one of the measurement lines is in a direction that is transverse to the direction in which the adhesive is applied to the item.
7. The system of any preceding claim, wherein the processing means monitors the length of an adhesive track applied to the item.
8. The system of any preceding claim, wherein the processing means monitors the width of an adhesive track applied to the item.
9. The system of any preceding claim, wherein the processing means monitors the number of adhesive tracks applied to the item.

10. The system of any preceding claim, wherein the processing means monitors the angle of application of an adhesive track applied to the item.

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11. The system of any preceding claim, wherein the camera means takes an image at the expected start of an applied adhesive area, and at the expected end of an applied adhesive area.

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12. The system of any preceding claim, wherein the camera means takes an image at one or more intermediate locations along an applied adhesive area.

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13. The system of any preceding claim, wherein the item position determining means comprises means for determining when the item has reached a preset position, and wherein the triggering means triggers the camera means to take an image a set time after the item has reached the preset position.

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14. The system of any preceding claim, including an encoder for monitoring the movement of a conveyor of the production line, wherein the item position determining means comprises means for determining when the item has reached a preset position, and wherein the triggering means triggers the camera means to take an image when the encoder indicates that the conveyor

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has moved a set distance since the item reached the preset position.

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15. The system of any preceding claim, wherein the item is a blank, and wherein the processing means analyses the images taken to determine whether one or more blank tabs have been removed.

16. The system of any preceding claim, including means for allowing the camera means to move transverse to the production line.

17. The system of any preceding claim, wherein the camera means is connected in use with an adhesive application means and is movable with the same.

5 18. The system of any preceding claim, wherein when the processing means determines that adhesive was not correctly applied, the item is marked for removal purposes.

10 19. The system of any preceding claim, including means for tracking an item, and wherein when the processing means determines that adhesive was not correctly applied, the tracking means tracks the item for rejection.

15 20. The system of claim 19, wherein the tracking means monitors the amount of movement of a conveyor of the production line about its path.

20 21. The system of any preceding claim, wherein the system includes an encoder for monitoring movement of a conveyor of the production line, wherein the system records in a memory address a pass or fail for an item dependant on the analysis by the processing means, and wherein the system increments the address for each record in accordance with the output of the encoder, the addresses corresponding to set positions on the conveyor line.

25 22. The system of claim 21, wherein the system checks, at set intervals, the record held in a memory address associated with a rejection location of the conveyor line, and activates rejection apparatus when the record in that memory address indicates a fail.

30 23. The system of any preceding claim, including counter means for counting the number of items determined to have an incorrect application of adhesive.

24. The system of any preceding claim, including means for obtaining the dimensions of an item to be monitored by passing a correctly configured item through the monitoring system.

25. The system of claim 24, including sensor means for sensing leading and following edges of an item, and means for determining a dimension of the item from the sensing of the edges.

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26. The system of any preceding claim, including a sensor for sensing leading and/or trailing edges of a flap portion of the item.

27. The system of claim 24, 25 or 26, wherein the system displays dimensional information, and allows an operator to confirm that the information is correct.

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28. The system of claim 27, wherein the system uses the confirmed dimensional information to determine when to trigger the camera means.

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29. The system of claim 28, wherein the system determines when to trigger the camera means based on the confirmed dimensional information and one or more offset values.

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30. The system of any preceding claim, wherein the item is a blank having at least one flap, wherein the system determines dimensions of the blank, wherein the system includes a preset offset by which an adhesive track is to be inwardly spaced from the blank dimensions; and wherein the system calculates a start point of the adhesive track and an end point of the adhesive track, and activates the camera means to take an image of areas in which it is calculated that a correctly applied adhesive track should appear.

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31. A production line having a monitoring system in accordance with any of the preceding claims.

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32. An method of monitoring the application of adhesive to an item on a production line, including the steps of determining the position of the item on the production line, triggering a camera to take an image of a monitored item at

one or more set item positions, and analysing the images produced to determine whether adhesive has been correctly applied to the item.

5 33. A monitoring system for monitoring items on a production line, the system including camera means for providing one or more images of an item to be monitored, means for determining one or more dimensions of the item to be monitored, and means for controlling the camera means dependent on the determination of these dimensions.

10 34. The system of claim 33, wherein the system includes means for outputting said dimensions, in order to obtain confirmation that the determined dimensions are acceptable.

15 35. The system of claim 34 or 35, wherein an operator inputs information regarding the item to be monitored, and the system includes means for checking the input information with the determined dimensions.

20 36. The system of claim 33, 34 or 35, wherein the control means includes offset data for determining the position of a monitored feature of the item based on the determined dimensions.

25 37. The system of claim 36, wherein the offset data is the offset position of an adhesive track from the edge of a blank flap or the position of a cut-out tab of a blank.

30 38. A system for rejecting an item from a production line, the system including monitoring means for determining whether an item is defective or not, means for rejecting a defective item, and means for monitoring the movement of the defective item and for issuing an instruction to the rejecting means to reject the item when the defective item reaches the rejection means.

39. A tab monitoring system for monitoring the removal of a tab from an item, wherein the system includes means for determining the position of the item on a production line, camera means for taking an image of a monitored

item, means for triggering the camera means to take an image of the item at one or more set item positions, and processing means for analysing the images produced and for determining the correct removal of a tab from this analysis.

5 40. A monitoring system substantially as hereinbefore described with reference to the accompanying drawings.

 41. A monitoring method substantially as hereinbefore described with reference to the accompanying drawings.

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 42. A production line substantially as hereinbefore described with reference to the accompanying drawings.

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